CLAIMS:

1. A patterned substrate for biosensing applications, wherein the pattern comprises hydrophilic and hydrophobic areas, and wherein selected ones of said areas comprise at least one reporter molecule, a property of which is detectable.

2. The patterned substrate as claimed in claim 1, wherein said reporter molecule is selected from the group consisting of a conjugated polyelectrolyte, copolymers or homopolymers of thiophene, pyrrole, aniline, furan, phenylene, vinylene or derivatives thereof.

3. The patterned substrate claimed in claim 2, wherein said conjugated polyelectrolyte is fluorescent.

4. The patterned substrate as claimed in any of claims 1 - 3, wherein said reporter molecule is capable of interaction with a biomolecule, and wherein said interaction will cause a change in said detectable property.

5. The patterned substrate as claimed in any of claims 1 – 4, wherein said substrate comprises silicon wafers, glass, glass slides, glass beads, glass wafers, silicon rubber, polystyrene, polyethylene, fluorinated hydrocarbon polymers, silica gel beads, gold, indium tin oxide-coated materials, filter paper made from nylon, cellulose or nitrocellulose, standard copy paper or variants thereof or separation media or other chromatographic media

6. The patterned substrate as claimed in any of claims 1 – 5, wherein selected ones of said areas further comprise any of one or more receptor molecules and one or more target analytes alone or in combination, and forming a complex with said reporter molecule.

7. The patterned substrate as claimed in any of claims 1 – 6, wherein said receptor molecules are selected from the group consisting of peptides, carbohydrates, nucleic acids, lipids, pharmaceuticals, antigens, antibodies, proteins, organic polymers or combination of these molecules capable of interacting with said target analyte.

8. The patterned substrate as claimed in any of claims 6 – 7, wherein said target analytes are selected from the group consisting of cells, viruses, bacteria, spores, microorganisms, peptides, carbohydrates, nucleic acids, lipids, pharmaceuticals, antigens, antibodies, proteins, enzymes, toxins, organic polymers or combinations of these molecules that are capable of interacting with said receptors or reporter/receptor complexes.

9. A biosensor device, comprising a patterned substrate as claimed in any of claims 1 – 8.

10. A biosensor apparatus, comprising a patterned substrate, wherein the pattern comprises hydrophilic and hydrophobic areas, and wherein selected ones of said areas comprise at least one reporter molecule, a property of which is detectable, the substrate being located in a receptacle, suitably a flow cell, the device further comprising means for detecting said detectable property.

11. A method of making a patterned substrate for biosensing applications, comprising

providing a substrate of a suitable material;

performing a stamping procedure to provide a pattern of hydrophilic and hydrophobic areas on said substrate, wherein one step of the stamping procedure comprises attaching at least one reporter molecule to at least selected ones of said areas, the property of said reporter molecule being detectable and which will change as a result of interaction with a biomolecule.

12. The method substrate as claimed in claim 11, wherein said reporter molecule is selected from the group consistng of a conjugated polyelectrolyte, copolymers or homopolymers of thiophene, pyrrole, aniline, furan, phenylene, vinylene or dereivatives thereof.

13. The method as claimed in claim 12, wherein said conjugated polyelectrolyte is fluorescent.

14. The method as claimed in any of claims 11 - 13, wherein said reporter molecule is capable of interaction with a biomolecule, and wherein said interaction will cause a change in said detectable property.

15. The method as claimed in any of claims 11 – 14, wherein said substrate comprises silicon wafers, glass, glass slides, glass beads, glass wafers, silicon rubber, polystyrene, polyethylene, fluorinated hydrocarbon polymers, silica gel beads, gold, indium tin oxide-coated materials, filter paper made from nylon, cellulose or nitrocellulose, standard copy paper or variants thereof and separation media or other chromatographic media

16. The method as claimed in any of claims 11 – 15, wherein said stamping procedure further comprising attaching to selected ones of said areas any of one or more receptor molecules and one or more target analytes alone or in combination, and forming a complex with said reporter molecule.

17. The method as claimed in any of claim 16, wherein said receptor molecules are selected from the group consisting of peptides, carbohydrates, nucleic acids, lipids, pharmaceuticals, antigens, antibodies, proteins, organic polymers or combination of these molecules capable of interacting with said target analyte.

18. The method as claimed in any of claims 16 or 17, wherein said target analytes are selected from the group consisting of cells, viruses, bacteria, spores, microorganisms, peptides, carbohydrates, nucleic acids, lipids, pharmaceuticals, antigens, antibodies, proteins, enzymes, toxins, organic polymers or combinations of these molecules that are capable of interacting with said receptors or reporter/receptor complexes.

19. The method as claimed in any of claims 11 - 18, wherein the stamping procedure comprises the following steps:

bringing a patterned or non-patterned stamp into conformal contact with the substrate for a period of time, the stamp being capable of modifying the surface of the substrate to exhibit said hydrophilic and hydrophobic areas;

placing a solution containing one or more of a reporter molecule, a target analyte, a receptor molecule or a complex between two or more of these on the pattern;

incubating for a period of time;

removing excess solution from the substrate.

20. The method as claimed in any of claims 11 - 18, wherein the stamping procedure comprises the following steps:

preparation of a film containing the reporter molecule, target analyte or complex between the reporter and target analyte from solution on said substrate;

placing a patterned or non-patterned stamp on the film on the substrate for a period of time, the stamp being capable of modifying the surface of the substrate to exhibit said hydrophilic and hydrophobic areas;

bringing a solution containing one or more of a reporter molecule, a target analyte, a receptor molecule or a complex between these into conformal contact with the pattern;

incubating a period of time;

removing excess solution is removed from the surface.

21. The method as claimed in any of claims 19 or 20, wherein the step of removing the excess solution is carried out by blowing an inert gas, such as nitrogen on the surface.

23. A method of determining selected properties of analytes, comprising: detecting a change of a property of a reporter molecule, provided on a device as claimed in any of claims 1-10, in response to an interaction between the reporter and an analyte; and using the detected change to determine said selected property of said analyte.

24. The method as claimed in claim 23, wherein the change of said property is detected by measuring fluorescence, Forester resonance energy transfer (FRET),

quenching of emitted light, absorption, impedance, refraction index, mass, visco-elastic properties, thickness or other physical properties.